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PATENT
454312-2420

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant(s)	:	Alan G. Barbour and Catherine J. Luke
U.S. Serial No.	:	08/588,637
For	:	COMPOSITIONS AND METHODS FOR ADMINISTERING BORRELIA BURGDORFERI ANTIGENS
Filed	:	January 19, 1996
Examiner	:	R. Swartz
Group Art Unit	:	1645

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APPEAL BRIEF WITH PETITION FOR EXTENSION OF TIME

Board of Patent Appeals and Interferences
Commissioner for Patents
Washington, D.C. 20231
Sir:

INTRODUCTION

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This is an Appeal from the February 21, 2001 Final Rejection by the Examiner, and from the November 8, 2001 Advisory Actions, finally rejecting claims 1-4, 6-10, 12 and 13.

This Brief is submitted in triplicate as required by 37 C.F.R. §1.192(a) and is accompanied by the requisite fee set forth in 37 C.F.R. §1.17(c) of $320.00; and, the Commissioner is hereby authorized to charge any additionally required fee for this Brief, or

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occasioned by this paper, or credit any overpayment in such a fee, to Deposit Account No. 50-0320.

RELIEF REQUESTED

It is respectfully requested that the rejection of claims 1-4, 6-10, 12 and 13 be reconsidered and withdrawn, and that a Notice of Allowance promptly issue.

PETITION FOR EXTENSION OF TIME

Appellants also respectfully petition, pursuant to 37 C.F.R. §§ 1.36(a) and 1.17(a), that the term for filing an Appeal Brief be extended four months, from October 20, 2001 (the Notice of Appeal having been received by the PTO on August 20, 2001), to up to and including February 20, 2002. A check in the amount of $1440.00 is enclosed in payment of the fee for the extension. The Commissioner is authorized to charge any additionally required fee for this petition for extension of time, or credit any overpayment in such a fee to Deposit Account No. 50-0320.

And, any fee occasioned by this Brief, or any overpayment in such fees, may be charged or credited to Deposit Account No. 50-0320.

REAL PARTY IN INTEREST

The real party in interest is The University of Texas System, having an address of: 201 West 7th Street, Austin, Texas 70701. The application was formerly licensed to Aventis Pasteur and may still be licensed Symbicom AB; ergo, it is believed that certainly The University of Texas System is a real party in interest, Aventis Pasteur is no longer a real party in interest, and that Symbicom AB may still be a real party in interest. (Appellants' assignee is endeavoring to ascertain the status of Symbicom AB and if they are no longer a licensee, Appellants' assignee will request a refund of 50% of the fees paid herewith and that the application be accorded Small Entity Status.)

RELATED APPEALS AND INTERFERENCES

Upon information and belief, the undersigned attorney does not believe that there is any appeal or interference that will directly affect, be directly affected by or have a bearing on the Board's decision in the pending appeal.

REQUEST FOR AN ORAL HEARING

An oral hearing is requested. A check in the amount of $280.00 is enclosed in payment of the fee for a request for an oral hearing. The Commissioner is authorized to charge any

additionally required fee for this request for an oral hearing, or credit any overpayment in such a fee to Deposit Account No. 50-0320.

STATUS OF THE CLAIMS

Claims 1-4, 6-10, 12 and 13 as set forth in Appendix A hereto (Exhibit A), are rejected under the judicially created doctrine of obviousness-type double patenting as unpatentable over claim 2 of U.S. Patent No. 5,688,512 ("the 512 patent") in view of the related patent of Bergstrom et al., U.S. Patent No. 5,523,089 ("the 089 patent") or Cohen, Immunization, in Basic & Clinical Immunology, 3rd ed. Fudenberg HH, Stites DP, Caldwell JL, Wells JV, ed. 1980 (Cohen).[1]

STATUS OF THE AMENDMENTS

Appellants believe that all the Amendments and papers submitted prior hereto have been entered.

SUMMARY OF THE INVENTION

The present invention involves a method for inducing an immunological response in a mammalian host susceptible to Lyme disease or *Borrelia burgdorferi* infection comprising mucosally administering a composition comprising substantially pure outer surface protein A (OspA) and a carrier or diluent, as set forth in claim 1, the only independent claim and upon which claims 2-4, 6-10, 12 and 13 depend either directly or indirectly.

In this method, the OspA can be lipidated OspA (claim 2); and, embodiments involving lipidated OspA do not need an adjuvant (*see, e.g.,* application at pages 7, 10, 13).

Indeed, claim 6, which depends on claim 3 (which provides that the administering is orally administering and which depends on claim 2 which specifies that the OspA is lipidated OspA), explicitly calls for the composition comprising substantially pure OspA and a carrier or diluent being free of any immunogenicity-enhancing adjuvant.

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[1] The 512 patent issued from U.S. application Serial No. 375,993, filed January 20, 1995 as a divisional of U.S. application of Ser. No. 08/079,601 filed Jun. 22, 1993, now U.S. Patent No. 5,523,089 (the 089 patent employed in the double patenting rejection), which is a continuation of application Ser. No. 07/924,798 filed Aug. 6, 1992, now abandoned, which is a continuation of application Ser. No. 07/422,881 filed Oct. 18, 1989, now abandoned. Thus, just as the text of the 512 patent is not available to the Examiner to employ in a double patenting rejection to supplement claim 2 of the 512 patent; so too is the specification text of predecessor the 089 patent unavailable to the Examiner to employ with claim 2 of the 512 patent; *see In re Kaplan*, 229 USPQ 678, 683 (Fed. Cir. 1986) (only claims of patent, not its disclosure, are available for use in a double patenting rejection). Accordingly, the use of the 089 patent specification in a double patenting rejection, it is respectfully submitted, is improper under *Kaplan*.

The composition employed in the method - comprising substantially pure OspA and a carrier or diluent - can be a solution, suspension, emulsion, syrup, elixir, capsule, tablet, hard-candy-like preparation, or a solid food item, or for oral administration (claims 12 and 13), e.g., as in a bait dropped for deer or other wild animals to innoculate such wild animals against Lyme disease or *Borrelia burgdorferi* infection (*see, e.g.,* application at page 7). Accordingly, the present invention is directed at breaking the chain of *Borrelia burgdorferi* infection that leads to Lyme disease in humans. More specifically, ticks containing blood contaminated with *Borrelia burgdorferi* infection from a previous bite to an animal transmit the infection to humans via a bite; and the infection develops in humans into Lyme disease. Innoculating animals against *Borrelia burgdorferi* infection via a bait drop can break the chain of infection that leads to Lyme disease in humans. (*See* application at pages 28-29.)

In embodiments wherein the OspA is lipidated OspA, the mucosally administering can be by orally administering (claim 3, which depends on claim 2). In these embodiments, the carrier or diluent can be a liquid (claim 4 as it depends on claim 3, which depends on claim 2), e.g., a liquid that is for oral administration, such as a solution, suspension, emulsion, syrup, elixir, or gelatin capsule containing liquid OspA (*see, e.g.* application at page 12). These embodiments are not only useful for ease of administration to wild animals, but also to domestic animals, and young children or infants, as a liquid can be administered merely by droppering into the mouth (*see* application at page 5).

Further still, the OspA employed in the claimed method can be recombinant OspA (claim 7), which can be lipidated (claim 8); and, in these embodiments, the mucosally administering can be by orally administering (claim 9).

The lipidated recombinant OspA employed in the claim 1 method can, according to claim10, be obtained by:

transforming a host organism by a plasmid containing a gene coding for a full-length wild-type *Borrelia burgdorferi* OspA lipoprotein and producing recombinant *Borrelia burgdorferi* OspA lipoprotein, and

purifying the recombinant *Borrelia burgdorferi* OspA lipoprotein substantially free from other bacterial proteins, and from lipopolysaccharide, under non-denaturing conditions from a lysate of the host organism so as to obtain a purified recombinant *Borrelia burgdorferi* lipoprotein which remains lipidated and is in a form administrable to the host.

The embodiments of the claims of the present application are patentably distinct from the generic claim 2 of the 512 patent, either alone or in combination with Cohen or the 089 patent specification (although, again, the 089 patent specification should not be available to be used in a double patenting rejection, as discussed in footnote 1).

ISSUES PRESENTED

- Whether claims 1-4, 6-10, 12 and 13 are patentable over claim 2 of the 512 patent in view of the text of the 089 patent or Cohen, i.e., whether there is no obviousness-type double patenting in view of claim 2 of the 512 patent in view of the text of the 089 patent or Cohen, when:

  ➢ claim 2 of the 512 patent involves a generic method for inducing a protective immune response against *Borrelia burgdorferi* in an animal or human susceptible to Lyme disease comprising administering substantially pure OspA in an amount effective for inducing the protective immune response and species or a subgenus such as the present claims can be patentably distinct from a genus such as claim 2 of the 512 patent;

  ➢ the text of the 089 patent, as mentioned in footnote 1 and hereafter, should **NOT** be available to the Examiner to employ in the double patenting rejection as the 089 patent issued from a predecessor application in the lineage of the 512 patent; and,

  ➢ nothing in claim 2 of the 512 patent, and in the text of the 089 patent, and in Cohen, directs the skilled artisan to:

    - mucosally administering OspA as called for in claim 1,
    - mucosally administering lipidated OspA as called for in claim 2,
    - orally administering lipidated OspA as called for in claim 3,
    - orally administering a liquid containing lipidated OspA as in claim 4,
    - orally administering lipidated OspA without any immunogenicity-enhancing adjuvant as provided in claim 6,
    - mucosally administering recombinant OspA as called for in claim 7,
    - mucosally administering recombinant lipidated OspA as in claim 8,
    - orally administering recombinant lipidated OspA as in claim 9,
    - mucosally administering recombinant lipidated OspA obtained by transforming a host organism by a plasmid containing a gene coding for a full-length wild-type *Borrelia burgdorferi* OspA lipoprotein and producing recombinant *Borrelia burgdorferi* OspA

lipoprotein, and purifying the recombinant *Borrelia burgdorferi* OspA lipoprotein substantially free from other bacterial proteins, and from lipopolysaccharide, under non-denaturing conditions from a lysate of the host organism so as to obtain a purified recombinant *Borrelia burgdorferi* lipoprotein which remains lipidated and is in a form administrable to the host, as specified in claim 10, and

- mucosally administering OspA in solution, suspension, emulsion, syrup, elixir, capsule, tablet, hard-candy-like preparation, or a solid food item, or in a form for oral administration, as provided in claims 12 and 13,

such that there is no teaching or suggestion in claim 2 of the 512 patent either individually or in combination with the 089 patent text (which should not be available to the Examiner) or Cohen of the particular subgenus or species recited in claims 1-4, 6-10, 12 and 13 of the present application, and there is no motivation in 512 patent claim 2 or the 089 patent text or Cohen to modify the subject matter thereof to arrive at the present invention; and ergo, 512 patent claim 2 in combination with the 089 patent or Cohen fails to teach or suggest the subject matter of claims 1-4, 6-10, 12 and 13 of the instant application?

In short, and as fully discussed below, Applicants answer the foregoing question in the affirmative, i.e., Appellants respectfully assert that there is NO obviousness-type double patenting and that the claims are patentable over claim 2 of the 512 patent in view of the 089 patent (which it is asserted should NOT be available to the Examiner) or Cohen; and, that the rejection of the present application should be reconsidered and withdrawn, with such relief also respectfully requested.

GROUPING OF CLAIMS

The Claims Do Not Stand Or Fall Together

For purposes of this appeal, claims 1-4, 6-10, 12 and 13 each constitute a separate invention, i.e. claims 1-4, 6-10, 12 and 13 do not stand or fall together.

It is respectfully requested that each and every recitation of each and every claim be fully considered in assessing patentability.

More specifically, claim 1 is directed to mucosally administering OspA for inducing an immunological response against Lyme disease or *Borrelia burgdorferi*.

Mucosal administration, as discussed in the application can involve oral administration or nasal administration or anal administration or vaginal administration, or peroral administration or

sublingual administration or gingival administration or alveolar administration or olfactory or respiratory administration or other mucosal routes of administration (*see, e.g.,* application at pages 11-12).

While some aspects of the present claims represent patentably distinct species that may be within claim 2 of the 512 patent (note as discussed *infra* 512 patent claim 2 requires protective immunity whereas the instant claims do not), the mucosal administration of claim 1 of the instant application is perhaps a subgenus within the broad context of "administering" of claim 2 of the 512 patent.

Further still, the mucosal administration in the claims of the present application can, but need not, elicit a protective immune response, whereas claim 2 of the 512 patent specifies that a protective immune response must be elicited, i.e., there must be vaccination according to 512 patent claim 2. Accordingly, while claim 1 of the instant application provides a subgenus, it is not entirely within, and not entirely dominated by, claim 2 of the 512 patent.

With this background, it is clear that claim 1 of the instant application provides a subgenus: mucosal administration of OspA.

Claim 2 of the instant application involves a distinct species within claim 1; namely, the mucosal administration of lipidated OspA.

Mucosal administration of lipidated OspA is a patentably distinct, particular, species within the OspA recitation of claim 1.

Indeed, as previously mentioned, lipidated OspA permits the method to be performed without the use of any immunogenicity-enhancing adjuvant (*cf.* Claim 6 and the application at pages 7, 10 and 13). This clearly demonstrates that claim 2 and the claims dependent thereon which provide for the uses of lipidated OspA are patentably distinct from the subject matter of claim 1 and other claims, such that claim 2 and the claims dependent thereon do not stand or fall with claim 1 and other claims.

Moreover, claim 3 and the claims dependent thereon (claims 4, 6), and claim 9, as well as claim 13, involve a distinct species within the subgenus of mucosal administration of claim 1 of the instant application, as well as a distinct species from the subject matter of other claims of the instant application; namely, oral administration.

Again, many modes of administration are encompassed by mucosal administration; and, oral administration is thus a patentably distinct species within the umbrella of mucosal administration.

Even further still, claim 3 provides particular patentably distinct subject matter from the subject matter of claims 1 and 2 and other pending claims because claim 3 depends on claim 2 and calls for oral administration of lipidated OspA.

Again, oral administration is patentably distinct from the more subgeneric concept of mucosal administration of claim 1, because, as discussed above, mucosal administration can include various modes of administration such as nasal, oral, anal, vaginal, etc. The administration of lipidated OspA is patentably distinct from the concept of administration of OspA because lipidated OspA provides a distinct advantage – the ability to administer without an adjuvant. And thus, oral administration of lipidated OspA is therefore patentably distinct from the subject matter of claims 1 and 2 and subject matter of other claims.

Claim 4 specifies oral administration of lipidated OspA in a liquid; and, since the form of the composition for oral or mucosal administration can be varied, e.g., the composition can be in the form of a solid or in the form of a spray or in the form of anal or vaginal suppositories, as well as in the form of a liquid, the recitation of "liquid" in claim 4 distinguishes claim 4 from claim 3; with the "oral" and "lipidated" recitations of claim 4 (via dependence) distinguishing claim 4 from claim 1, and the "oral" recitation of claim 4 (via dependence) distinguishing claim 4 from claim 2. Ergo, claim 4 is patentably distinct from claims 1-3 and other pending claims.

Claim 6 is clearly distinct from the other pending claims as claim 6 requires oral administration of lipidated OspA without any immunogenicity-enhancing adjuvant. This combination: oral administration of lipidated OspA without any immunogenicity-enhancing adjuvant clearly distinguishes claim 6 from the other claims, especially as the ability to avoid using an adjuvant is a clear advantage.

Claim 7 is likewise distinct from the other claims as claim 7 calls for mucosal administration of recombinant OspA. Recombinant OspA, i.e., OspA produced via recombinant technology (by expression from a vector which is not *Borrelia burgdorferi*) is distinct from OspA; for instance, it can be purer than OspA from other sources. Ergo, the subject matter of claim 7 is patentably distinct from the subject matter of the other claims of the present application.

Claim 8 is even further distinguished from other claims in that claim 8 calls for mucosal administration of recombinant lipidated OspA. As recombinant OspA is distinct from OspA (e.g., because recombinant OspA can be purer), and lipidated OspA is distinct from OspA (e.g., because lipidated OspA provides the advantage of not needing an adjuvant), the claim 8 subject matter is thus distinct from the subject matter of the other claims.

Claim 9 calls for oral administration of recombinant lipidated OspA. And as "oral administration" is distinct from mucosal administration (e.g., as discussed above in view of the many modes of administration within mucosal administration), and recombinant OspA is distinct from OspA (e.g., because recombinant OspA can be purer), and lipidated OspA is distinct from OspA (e.g., because lipidated OspA provides the advantage of not needing an adjuvant), claim 9 is clearly distinct from the subject matter of the other claims.

Claim 10 is especially distinct from the subject matter of the other claims because claim 10 calls for mucosal administration of recombinant lipidated OspA obtained by: transforming a host organism by a plasmid containing a gene coding for a full-length wild-type *Borrelia burgdorferi* OspA lipoprotein and producing recombinant *Borrelia burgdorferi* OspA lipoprotein, and purifying the recombinant *Borrelia burgdorferi* OspA lipoprotein substantially free from other bacterial proteins, and from lipopolysaccharide, under non-denaturing conditions from a lysate of the host organism so as to obtain a purified recombinant *Borrelia burgdorferi* lipoprotein which remains lipidated and is in a form administrable to the host. Accordingly, the recombinant lipidated OspA employed in the claim 10 method is produced by a particular method whereby the OspA is free from other bacterial proteins, and from LPS and not denatured. These recitations clearly distinguish claim 10 from the subject matter of the remaining claims.

And, claim 12 calls for mucosal administration of an OspA composition in the form of a solution, suspension, emulsion, syrup, elixir, capsule, tablet, hard-candy-like preparation, or a solid food item; essentially mucosal administration of liquid or oral forms of OspA, which limit the claim 1 method to distinct species within the umbrella "mucosal administration". Therefore, claim 12 is distinct from the subject matter of other claims.

Accordingly, claims 1-4, 6-10, 12 and 13 do not stand or fall together; and, it is respectfully requested that each of these claims be considered individually, and that each and every recitation of each of the pending claims be considered in assessing the patentability of each of these claims individually and separately.

ARGUMENT

THE REJECTION OF ALL CLAIMS UNDER THE JUDICIALLY CREATED DOCTRINE OF OBVIOUSNESS-TYPE DOUBLE PATENTING IS OVERCOME

The 089 patent is not available to the Examiner to use in the rejection

As discussed above, e.g., in footnote 1, the 089 patent issued from a predecessor application with respect to the 512 patent, and thus the disclosure of the 089 patent should not be available to the Examiner to employ in a double patenting rejection involving claim 2 of the 512 patent in the same vein as the disclosure in the 512 patent is unavailable to the Examiner to use in a double patenting rejection involving claim 2 of the 512 patent.

More specifically, the 512 patent (whose claim 2 is employed in the double patenting rejection) issued from U.S. application Serial No. 375,993, filed January 20, 1995 as a divisional of U.S. application of Ser. No. 08/079,601 filed Jun. 22, 1993, now U.S. Patent No. 5,523,089 (the 089 patent employed in the double patenting rejection), which is a continuation of application Ser. No. 07/924,798 filed Aug. 6, 1992, now abandoned, which is a continuation of application Ser. No. 07/422,881 filed Oct. 18, 1989, now abandoned.

According to *In re Kaplan*, 229 USPQ 678, 683 (Fed. Cir. 1986), I*n re Braithwaite*, 154 USPQ 29 (CCPA 1967) and MPEP 804 (*see* Eighth Edition, August 2001 at page 800-22), the disclosure of the 512 patent may not be used by the Examiner in making the present double patenting rejection because only the claims of 512 patent, not its disclosure, are available for use in a double patenting rejection.

Thus, just as the text of the 512 patent is not available to the Examiner to employ in a double patenting rejection to supplement claim 2 of the 512 patent; so too is the specification text of predecessor the 089 patent unavailable to the Examiner to employ with claim 2 of the 512 patent.

To allow the Examiner to employ the text of the predecessor 089 patent in a double patenting rejection involving claim 2 of the related 512 patent would eviscerate the prescription against using the disclosure of the 512 patent in a double patenting rejection that is set forth in the case law and the MPEP, e.g., *In re Kaplan*, 229 USPQ 678, 683 (Fed. Cir. 1986), I*n re Braithwaite*, 154 USPQ 29 (CCPA 1967) and MPEP 804 (*see* Eighth Edition, August 2001 at page 800-22).

Simply, only claims of the 512 patent, not its disclosure - whether in the form of the 512 patent specification or the 089 patent specification - are available for use by the Examiner in a double patenting rejection involving claims of the 512 patent.

Accordingly, the use of the 089 patent specification in the instant double patenting rejection, it is respectfully submitted, is improper and clearly erroneous under the case law and the MPEP; and, as discussed in the footnote appended to this sentence, the use of the 089 patent against the instant application is contrary to 35 USC 121 because the 089 and 512 patents separately issued due to restriction requirements during the prosecution of applications that led to the issuance of those patents, such that just as the 089 patent is not available against the 512 patent under Section 121, the 089 patent is likewise not available against the present application because since the present application claims a lineage to the application from which the 089 patent issued, the present application also enjoys the benefits of the restriction requirements in the lineage of the 089 and 512 patents, namely that the 089 patent is disqualified from being used against the instant application under 35 USC 121 just as it cannot be used against the 512 patent..[2]

Therefore, the double patenting rejection should be reconsidered and withdrawn, especially insofar as it relies upon the 089 patent; and, reconsideration and withdrawal of the double patenting rejection, especially insofar as it relies upon the 089 patent, are respectfully requested.

Deference should be given to the previous Examiner's indication of allowance

Originally, Examiner Hazel Sidberry was the Examiner on the present application. Examiner Sidberry was also the Examiner on the 512 and 089 patents. In a February 10, 1998 telephone interview, as reported in paper numbers 9 and 11, Examiner Sidberry concluded that the cancellation of claim 5 would place the application into condition for allowance, i.e.,

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[2] Indeed, it is noted that the 089 and 512 patents separately issued as a result of restriction of claimed subject matter such that pursuant to 35 USC 121, the 089 patent is not able to be cited against the later 512 patent. The Board and the Examiner are invited to review the prosecution of all of the applications that led to the 089 and 512 patents. The instant application claims a lineage back to USSN 07/422,881 and Danish application 5902/88, filed October 24, 1988, just as do the 512 and 089 patents. Just as the 089 patent is not available against the 512 patent under 35 USC 121, the 089 patent should also not be available against the present application under 35 USC 121; and, for this reason too, it is respectfully requested that the double patenting rejection based on 512 patent claim 2 and the 089 patent specification be reconsidered and withdrawn. Simply, just as the 512 and 089 patents are recognized as divisionals between each other, the present application is also a divisional as to the claimed subject matter of the 089 patent, in view of the restriction requirements during the prosecution of applications in the lineage of the 089 and 512 patents, such that the 089 patent must be unavailable against the instant application under 35 USC121.

Examiner Sidberry – the Examiner on the 512 and 089 patents and intimately knowledgeable of that which those patents claim – concluded that there is no obviousness-type double patenting between the present claims and the claims of the 512 patent.

Deference should be given to Examiner Sidberry's correct determination of no double patenting.

There has been no showing in the record that Examiner Sidberry's indication of allowability was arbitrary, capricious, or clearly erroneous.

More in particular, deference must be given to Examiner Sidberry's decision to allow the claims in light of the 512 patent. *See American Hoist & Derrick Company* v. *Sowa & Sons, Inc.*, 725 F.2d 1350, 1360, 220 U.S.P.Q. 763, 771 (Fed. Cir. 1984) ("Deference is due the Patent and Trademark Office decision to issue the patent with respect to evidence bearing on validity which it considered"), wherein the Federal Circuit noted:

> When no prior art other than that which was considered by the PTO examiner is relied on by the attacker, he has the added burden of overcoming the deference that is due to a qualified government agency presumed to have properly done its job, which includes one or more examiners who are assumed to have some expertise in interpreting the references and to be familiar from their work with the level of skill in the art and whose duty it is to issue only valid patents.

725 F.2d at 1359, 220 U.S.P.Q at 770.

Indeed, as such deference must be afforded even to an Examiner of a reissue proceeding, in the present instance such deference must be given to Examiner Sidberry in the instant case. *See Fromson* v. *Advance Offset Plate, Inc.*, 755 F.2d 1549, 1558, 225 U.S.P.Q. 26, 33 (Fed. Cir. 1985) (requiring that the "exhaustive consideration given the prior art by the PTO" must be weighed in determining patentability).

Consequently, and as set by the U.S. Supreme Court, the burden to assert double patenting as to claims which were deemed allowed by Examiner Sidberry is quite high. *See Dickinson* v. *Zurko*, 527 U.S. 150, 152, 50 U.S.P.Q.2d 1930,1932 (1999) (setting the standard as "arbitrary, capricious, an abuse of discretion, or unsupported by substantial evidence"); *see also Singh* v. *Brake*, 222 F.3d 1362, 55 U.S.P.Q.2d 1673 (Fed. Cir. 2000) (Gajarsa, J. concurring) ("we must give proper deference to the PTO's factual determinations. Because of the deference that must be afforded, we cannot, and should not, ever substitute our own factual determinations for those made by the PTO.").

Accordingly, deference should be given to the correct determination of no obviousness-type double patenting previously made by Examiner Hazel Sidberry, who was not only the Examiner in the present application, but also the Examiner in the 512 and 089 patents and thus intimately knowledgeable of the claims of the 512 patent and how the present invention patentably distinguishes therefrom.

Since the PTO has not met the burden required to overturn Examiner Sidberry's correct determination of allowability, it is respectfully asserted that the double patenting rejection is clearly erroneous and must be reconsidered and withdrawn, with such relief respectfully requested.

There is no prima facie obviousness between the instant claims and 512 patent claim 2

A finding of obviousness-type double patenting turns on whether the invention defined in a claim in the application in issue is an obvious variation of the invention defined in a claim in a prior patent. *See, e.g., In re Berg*, 46 U.S.P.Q.2d, 1226 (Fed. Cir. 1998); *see also* MPEP 804 (*see* Eighth Edition, August 2001 at page 800-23 – 800-24). In order for an obviousness-type double patenting rejection to stand, the Examiner must show that the claims in issue are obvious based solely on the claims in the prior patent; the disclosure in the prior patent may not be used as prior art. Furthermore, any obvious-type double patenting rejection should make clear: (1) the differences defined by the conflicting claims; and, (2) the reasons why a person of ordinary skill in the art would conclude that the invention defined in the claim in issue is an obvious variation of the invention defined in a claim in the patent.

In the November 8, 2001 Advisory Action, the Examiner asserts that "the scope of the recitation in claim 2 of U.S. Pat. No. 5,688,512 of 'comprising administering a vaccine' encompasses any administration (mucosal, intramuscular, subcutaneous, etc.)" and then summarily concludes that "the administration of instant claim 1 is an obvious variant."

The problems with the Examiner's analysis include: (1) that it does not consider claim 2 of the 512 patent in its entirety; (2) that it does not consider each of the claims of the instant application individually, as the claims of the instant application do not stand or fall together; (3) that it does not consider all of the recitations of instant claim 1, or all of the recitations of each of claims 1-4, 6-10, 12 and 13 of the instant application; and (4) it does not properly apply an analysis analogous to a failure to meet the nonobviousness requirement of 35 USC 103 as required by MPEP 804 (*see* Eighth Edition, August 2001 at page 800-22).

Under the one-way obviousness test, the Examiner was required to show that the instantly claimed invention in each of claims 1-4, 6-10,12 and 13 is obvious over claim 2 of the 512 patent Under the Federal Circuit's two-way analysis to determine whether an obviousness-type double patenting should stand: "the test is whether the subject matter of the claims of the patent sought to be invalidated would have been obvious from the subject matter of the claims of the [application], and vice versa." *Carman Industries v. Wahl*, 724 F.2d 932, 940 (Fed. Cir. 1983).

Clearly both of these tests fail in the instant situation because the subject matter of the claims of the '512 patent would not have been obvious from the subject matter of the instant claims, and *vice versa*. Hindsight is necessary for the rejections the Examiner has made, which is impermissible by the nature of obviousness-type double patenting.

The pending claims in the instant application are directed to a method of inducing an immunological response by mucosally administering substantially pure OspA. The Examiner alleges these claims are obvious over claim 2 of U.S. Patent No. 5,688,512 Bergstrom U.S. Patent No. 5,523,089 or SN Cohen.

Claim 2 of the '512 patent is directed to a method of inducing a **protective** immunological response by administering substantially pure OspA; and while the administration can be by any route, no particular route of administration is specified in claim 2 of the '512 patent. Thus, there is nothing in the disclosure of claim 2 of the '512 patent that teaches or suggests **the particular mucosal administration** of substantially pure OspA to produce the **generalized** immunological response claimed in the instant application

As shown in diagram 1 immediately below, the commonality between these two methods (administration to elicit a protective immune response v. mucosal administration to elicit any immunological response) is minimal and one does not teach or suggest the other.

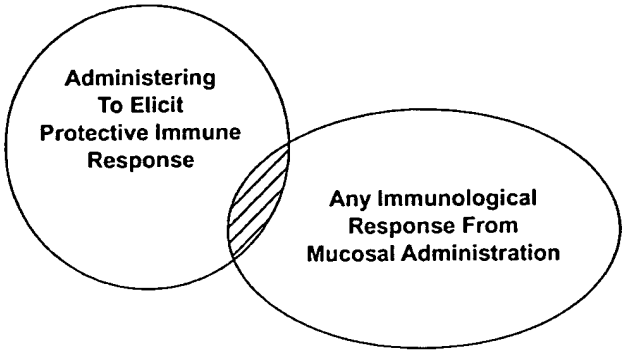


Diagram 1

More in particular, the present claims relate to a method for inducing an immunological response comprising **mucosally** administering a composition comprising substantially pure OspA; e.g., **orally** administering a composition comprising substantially pure OspA.

The Office Action has failed to demonstrate how the generic claim 2 of U.S. Patent No. 5,688,512, in and of itself (since the specification of U.S. Patent No. 5,688,512 is unavailable to make the double patenting rejection) in any way particularly teaches or suggests either mucosal administration or oral administration, or administration for inducing an immunological response as opposed to a protective immune response.

The fact that U.S. Patent No. 5,688,512 claims a method for inducing a protective immunological response comprising administering a vaccine comprising substantially pure OspA is of no moment. It is incumbent upon the Examiner to show how and why oral and mucosal administration are obvious from the generic recitation of "administering" in the claims of U.S. Patent No. 5,688,512. For instance, why and how from just the claims of U.S. Patent No. 5,688,512 should one select oral or mucosal administration as opposed to intradermal, subcutaneous, intracutaneous, intramuscular, and all of the other ways one can "administer" substantially pure OspA, especially considering that the typical way a vaccine is administered is by injection, and not by oral or mucosal routes.

It is also incumbent upon the Examiner to show how and why oral and mucosal administration for any immunological response is obvious from the recitations of generically administering to achieve a protective immune response, again considering all the possible ways to administer an antigen, that injection is the typical route of administration, and a protective response is of different scope than an immunological response.

Having failed to so demonstrate, *inter alia*, why one should select oral or mucosal administration from all of the ways one can administer OspA based upon only the text of the claims of U.S. Patent No. 5,688,512, the obviousness-type double patenting rejection is fatally defective and cannot stand.

Similarly, the Office Action has failed to demonstrate why one would select lipidated OspA for mucosal or oral administration, versus other forms of OspA. The Office Action has also failed to demonstrate why one would select lipidated OspA in a liquid for oral administration versus other forms of OspA and other modes of administration. The Office Action has additionally failed to demonstrate why one would select lipidated OspA without an adjuvant for oral administration as opposed to other forms of OspA and other forms of administration. The Office Action has yet further still failed to demonstrate why one would select recombinant lipidated OspA prepared by the claim 10 method which is thereby free of other bacterial proteins and LPS and is not denatured for mucosal administration, versus other forms of OspA and other routes of administration of OspA. And, the Office Action has failed to demonstrate why one would select the essentially oral or liquid forms of OspA of claims 12 and 13 for mucosal administration, versus other forms of OspA and other routes of administration. Simply, the Office Action has failed to demonstrate the requisite teaching, suggestion, or motivation that would have directed the skilled artisan to modify claim 2 of the 512 patent to arrive at the instantly claimed invention in each of claims 1-4, 6-10, 12 and 13 of the present application.

Accordingly, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the mucosal administration of lipidated OspA; and, claim 2 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Likewise, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the oral administration of lipidated OspA; and, claim 3 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Similarly, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the oral administration of lipidated OspA in a liquid form; and, claim 4 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Furthermore, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the oral administration of lipidated OspA without any immunogenicity-enhancing adjuvant; and, claim 6 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Also, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the mucosal administration of recombinant OspA; and, claim 7 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

In addition, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the mucosal administration of recombinant lipidated OspA; and, claim 8 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Likewise, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the oral administration of recombinant lipidated OspA; and, claim 9 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Similarly, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the mucosal administration of recombinant lipidated OspA wherein the recombinant lipidated OspA is obtained by transforming a host organism by a plasmid containing a gene coding for a full-length wild-type *Borrelia burgdorferi* OspA lipoprotein and producing recombinant *Borrelia burgdorferi* OspA lipoprotein, and purifying the recombinant *Borrelia burgdorferi* OspA lipoprotein substantially

free from other bacterial proteins, and from lipopolysaccharide, under non-denaturing conditions from a lysate of the host organism so as to obtain a purified recombinant *Borrelia burgdorferi* lipoprotein which remains lipidated and is in a form administrable to the host, such that the recombinant lipidated OspA employed in the claim 10 method is produced by a particular method whereby the OspA is free from other bacterial proteins, and from LPS and not denatured; and, claim 10 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Further still, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the mucosal administration of OspA in the form of a solution, suspension, emulsion, syrup, elixir, capsule, tablet, hard-candy-like preparation, or a solid food item; essentially the mucosal administration of liquid or oral forms of OspA; and, claim 12 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Also, claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen, does not teach or suggest the mucosal administration of OspA in the form for oral administration; and, claim 13 of the instant application does not teach or suggest vaccination as in claim 2 of the 512 patent, either individually or in combination with the 089 patent specification or Cohen.

Accordingly, neither the one-way test nor the two-way test of obviousness-type double patenting is satisfied by the instant claims and 512 patent claim 2, either individually or in combination with the 089 patent specification or Cohen.

Indeed, none of 512 patent claim 2, the 089 patent specification, and Cohen, teach or suggest the particular use of lipidated OspA, such as in claims 2 and 8 and the claims dependent thereon, or the advantages of lipidated OspA (e.g., ability to avoid the use of an adjuvant, such as recited in claim 6), or mucosal administration of recombinant lipidated OspA which is prepared by the method recited in claim 10 such that the recombinant lipidated OspA is substantially free from other bacterial proteins and from LPS, and not denatured, or the oral administration of lipidated OspA and the advantages thereof, as set forth in claim 3 and the claims dependent thereon.

Thus, there is no double patenting between the instant claims and 512 patent claim 2, either individually or in combination with the 089 patent specification or Cohen.

The fact that the claims of U.S. Patent No. 5,688,512 may dominate some embodiments of the present claims (and the fact that claims of the present application, when issued, may cover some embodiments within claims of the '512 patent) **is not controlling**. *In re Kaplan,* 229 U.S.P.Q. 678, 683 (Fed. Cir. 1986) ("**there must be some clear evidence to establish why the variation [between claims of a patent and of the application] would have been obvious [for double patenting rejection] which can properly qualify as 'prior art' ... if obviousness predicated on the level of skill in the art, prior art evidence is needed to show what that level of skill was**"; and **only claims of patent or patent application, not its disclosure, are available for use in double patenting rejection**).

Any dominance of the presently claimed subject matter by the claims of U.S. Patent No. 5,688,512 and any coverage of '512 patent subject matter by the present claims, when issued, is not controlling in determining double patenting. *In re Kaplan*, 229 U.S.P.Q. at 681 ("**This commonplace situation [of one patent dominating another] is not, per se double patenting as the board seemed to think**"). It is respectfully submitted that contrary to *In re Kaplan*, the Examiner is equating dominance with double patenting; and thus, the double patenting rejection is improper.

In further support of the proposition that U.S. Patent No. 5,688,512 can claim a genus which dominates some embodiments of the present claims while the present claims still remain patentably distinct, the Board is respectfully reminded that a species (or subgenus) may be patentably distinct from a genus such that a first patent issues to one party with claims directed to the genus, and a second patent issues to another party with claims directed to the species or subgenus. *See e.g., In re Baird,* 29 USPQ 2d 1550 (Fed. Cir. 1994); *In re Jones,* 21 USPQ 2d 1941 (Fed. Cir. 1992); *In re Taub, Wendler, and Slates,* 146 USPQ 384 (C.C.P.A. 1965); *In re Petering,* 133 USPQ 275 (C.C.P.A. 1962); *Hsing v. Myers,* 2 USPQ2d 1861 (BOPAI 1987).

The Commentary to Rules of Practice, 49 Fed. Reg. 48416, 48433 (Dec. 12, 1984), 1050 O.G. 395 (Jan. 29, 1985), corrected to 50 Fed. Reg. 23122 (May 31, 1985), 1059 O.G. 27 (Oct. 22, 1985), provides in pertinent part:

> Thus, if a species is patentable over a genus, the species is a "separate patentable invention" from the genus. Compare *In re Taub,* 348 F.2d 556, 146 USPQ 384 (C.C.P.A., 1965).

In this regard, attention is also directed to *In re Sasse,* 207 U.S.P.Q. 107 (C.C.P.A. 1980), wherein the Court of Customs and Patent Appeals held that a claim to a genus and a claim to a species within the genus are not claims to the same or substantially the same subject matter in the sense of 35 U.S.C. §135(b).

Essentially, if the present Applicants were strangers to the inventive entity of U.S. Patent No. 5,688,512 (but had the same effective filing date thereof of October 1988, as in the present situation), the PTO would not declare an interference between the present application and U.S. Patent No. 5,688,512 because the claims of the present application and of U.S. Patent No. 5,688,512 would be deemed patentably distinct: the claims of U.S. Patent No. 5,688,512 being directed to a particular genus; and the present claims being directed to a patentably distinct genus or distinct subgenus or species (especially since there is nothing in the art, as of the October 1988 effective filing date of the present application, in any way teaching or suggesting oral or mucosal administration of OspA or the various embodiments set forth in the instant claims, as discussed above). The fact that the genus claims of U.S. Patent No. 5,688,512 may dominate some embodiments of the present claims and that the present claims may cover some embodiments within the 512 patent, is of no moment.

Further still, it is respectfully submitted that it is recognized as established practice in the U.S. Patent and Trademark Office that inventions claiming an "immune response" and those claiming a "protective immune response" (i.e., immunization vs. vaccination as is the distinction between an aspect of the instant claims vs. claim 2 of the 512 patent) are separate, patentably distinct inventions. In fact, such inventions, if present in the same application, are often subject to restriction requirements, as has been the experience of the undersigned. If such claims, when presented in the same application, elicit a restriction requirement, then when presented in separate applications cannot be subject to double patenting; *cf.* 35 USC 121; MPEP 804.

Accordingly, based upon the restriction practice at the USPTO, the present claims cannot be considered to be obvious variants of claim 2 of the 512 patent or *vice versa*. Rather, under the restriction practie at the USPTO, the present claims would be considered distinct from claim 2 of the 512 patent. Ergo, the double patenting rejection is clearly erroneous and contrary to the restriction practice at the USPTO and must be reconsidered and withdrawn.

The secondary references cited by the Examiner do not supply that for which the Examiner has cited them, and they fail to supply the deficiencies acknowledged by the Examiner.

Firstly, as discussed herein, Bergstrom – or the text of U.S. Patent No. 5,523,089 – is not available to the Examiner to use in an obviousness-type double patenting rejection. Bergstrom is related to U.S. Patent No. 5,688,512, as both Bergstrom and U.S. Patent No. 5,688,512 are children of the same original U.S. and Danish applications. As discussed herein, to allow the Examiner to rely upon the text of Bergstrom when he cannot rely upon the text of U.S. Patent No. 5,688,512 would render the directives of the MPEP, the case law and the statute (e.g., 35 USC 121) hollow. Thus, the Office Action improperly relies upon Bergstrom, U.S. Patent No. 5,523,089 in making the rejection. Furthermore, to choose the presently claimed subject matter from the text of Bergstrom requires improper hindsight gleaned from the present application and claims.

Secondly, Cohen does not teach or suggest oral or mucosal administration of OspA, or the various aspects of instant claims 1-4, 6-10, 12 and 13 as discussed herein (e.g., *supra*); and is thus no better than the general teachings one finds in the broad, generic claim 2 of U.S. Patent No. 5,688,512. From the entire universe of routes of administering vaccines, one must still select mucosal and oral administration from Cohen – a choice that also requires selective hindsight gleaned from the present application and the present claims; and such selective hindsight gleaned from the present application and the present claims is improper. And, Cohen does not direct the skilled artisan to oral or mucosal administration of OspA, or the various aspects of claims 1-4, 6-10, 12 and 13 as herein discussed, e.g., lipidated OspA as in claim 2 and claims dependent thereon, use of lipidated OspA without an adjuvant as in claim 6, use of recombinant lipidated OspA from the particular method of claim 10 such that the recombinant lipidated OspA is free of other bacterial proteins, free of LPS and not denatured, or the use of particular forms of OspA compositions such as liquid or for oral administration as in claims 4, 12 and 13, *inter alia*. Thus, Cohen does not direct the skilled artisan to the present invention, and does not supply that for which it is cited, and does not supply the deficiencies of claim 2 of the 512 patent.

The Board is also respectfully requested to reconsider and withdraw the double patenting rejection with the following in mind.

As mentioned previously, MPEP 804 requires that there be an analysis in a double patenting rejection that parallels the analysis of a Section 103 rejection.

Under Section 103, it is well established that "there must be some reason for the combination other than the hindsight gleaned from the invention itself". *Uniroyal v. Rudkin-Wiley*, 5 USPQ 2d 1434, 1438 (Fed. Cir. 1980).

There also must be some prior art teaching which would have provided the necessary incentive or motivation for modifying the primary reference in the manner suggested by the Examiner. *In re Laskowski*, 12 USPQ 2d 1397, 1399 (Fed. Cir. 1989).

And, "obvious to try" is not the standard under 35 USC §103. *In re Fine*, 5 USPQ 2d 1596, 1599 (Fed. Cir. 1988).

Further, as stated by the Court in *In re Fritch*, 23 UPPQ 2d 1788, 1783-1784 (Fed. Cir. 1992): "The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggests the desirability of the modification."

The secondary references relied upon in the Office Action fail to provide the necessary incentive or motivation for modifying the primary reference – claim 2 of the 512 patent – to arrive at each invention of each of claims 1-4, 6-10, 12 and 13 of the instant application; and therefore, the double patenting rejection fails.

Accordingly, reconsideration and withdrawal of the rejection of claims 1 to 4, 6 to 10, 12 and 13 under the judicially created doctrine of obviousness-type double patenting is warranted and such relief is respectfully requested.

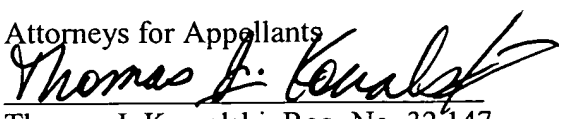
CONCLUSION

For the reasons discussed in this brief and the arguments of record (incorporated herein by reference), claims 1-4, 6-10, 12 and 13 are patentable over claim 2 of the 512 patent, either individually or in combination with the text of the 089 patent or Cohen. It is, therefore, respectfully submitted that the Examiner erred in rejecting claims 1-4, 6-10, 12 and 13, and a reversal of the rejection of claims 1-4, 6-10, 12 and 13 by this Honorable Board, and prompt issuance of a Notice of Allowance, are earnestly solicited.

Respectfully submitted,

FROMMER LAWRENCE & HAUG, LLP

Attorneys for Appellants



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PATENT
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Applicant(s)	:	Alan G. Barbour and Catherine J. Luke
U.S. Serial No.	:	08/588,637
For	:	COMPOSITIONS AND METHODS FOR ADMINISTERING BORRELIA BURGDORFERI ANTIGENS
Filed	:	January 19, 1996
Examiner	:	R. Swartz
Group Art Unit	:	1645

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New York, NY 10151

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Charles Jackson
(Signature of person mailing paper or fee)

APPENDIX TO APPEAL BRIEF: PENDING CLAIMS

Board of Patent Appeals and Interferences
Commissioner for Patents
Washington, D.C. 20231
Sir:

1. A method for inducing an immunological response in a mammalian host susceptible to Lyme disease or *Borrelia burgdorferi* infection comprising mucosally administering a composition comprising substantially pure outer surface protein A (OspA) and a carrier or diluent.

2. The method of claim 1 wherein the OspA is lipidated OspA.

3. The method of claim 2 wherein the mucosally administering is by orally administering.

4. The method of claim 3 wherein the carrier or diluent is a liquid.

6. The method of claim 3 wherein the composition comprising substantially pure OspA and a carrier or diluent is free of any immunogenicity-enhancing adjuvant.

7. The method of claim 1 wherein the OspA is recombinant OspA.

8. The method of claim 7 wherein the OspA is lipidated.

9. The method of claim 8 wherein the mucosally administering is by orally administering.

10. The method of claim 8 wherein the OspA is obtained by:

transforming a host organism by a plasmid containing a gene coding for a full-length wild-type *Borrelia burgdorferi* OspA lipoprotein and producing recombinant *Borrelia burgdorferi* OspA lipoprotein, and

purifying the recombinant *Borrelia burgdorferi* OspA lipoprotein substantially free from other bacterial proteins, and from lipopolysaccharide, under non-denaturing conditions from a lysate of the host organism so as to obtain a purified recombinant *Borrelia burgdorferi* lipoprotein which remains lipidated and is in a form administrable to the host.

12. The method of claim 1 wherein the composition comprising substantially pure OspA and a carrier or diluent is a solution, suspension, emulsion, syrup, elixir, capsule, tablet, hard-candy-like preparation, or a solid food item.

13. The method of claim 1 wherein the composition is for oral administration.